ES.0 Executive Summary

ES.1 Results from the Preliminary Alternatives Analysis

Purpose and Location

This Preliminary Alternatives Analysis Report for the Bakersfield to Palmdale Section identifies feasible and practicable alternatives to carry forward for environmental review and evaluation in the draft environmental impact report/environmental impact statement (EIR/EIS) under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

The environmental document for the Bakersfield to Palmdale Section will examine the area between the Bakersfield and Palmdale HST Stations. However, for the purposes of this Alternatives Analysis, study area boundaries have been set by match points with the Fresno to Bakersfield Section on the north and the Palmdale to Los Angeles Section on the south. Within those limits, the Bakersfield to Palmdale section has been divided into three subsections having widely varying topography, climate, and land use (see Figures ES-1 through ES-3). The subsections are (from north/west to south/east):

- **Edison** (E) – Begins east of the Bakersfield HST Station at Edison Highway/Oswell Street, passes through the unincorporated community of Edison, and follows SR-58 before crossing Caliente Creek. This Central Valley subsection consists mainly of industrial and residential land uses in the west and agricultural land uses in the east.
- **Tehachapi** (T) – Begins east of Caliente Creek, passes over the Tehachapi Mountains to the high desert west of Mojave, and ends near SR-14 and Purdy Avenue in Mojave. This subsection includes forest, desert, mountain areas, some residential land uses, and light industrial facilities.
- **Antelope Valley** (AV) – Begins at Purdy Avenue in Mojave, generally parallels Sierra Highway and the UPRR through the desert communities of Rosamond and Lancaster, and ends at Avenue M between the cities of Lancaster and Palmdale. The Antelope Valley Subsection runs through primarily low density urban land uses separated by extended open areas.

No HST stations are located between Bakersfield and Palmdale.

Recommendations

The following alignment alternatives are recommended to be carried forward for detailed study in the Bakersfield to Palmdale Section HST Project EIR/EIS:

Edison Subsection

- E2A: SR-58 Adjacent North Side (Partially Elevated)
- E2B: SR-58 Adjacent North Side (All Elevated)
- E4: Along Edison Highway, Through Town of Edison (All Elevated)

Tehachapi Subsection

- T3-1: 2.65% Average Grade, Sustained Grade of 2.75% Over 12 miles
- T3-B: Phase Break Option for T3-1, 2.65% Average Grade, 3.5% Sustained Grade over 3.4 miles
- T3-2: 2.5% Average Grade, Sustained Grade of 2.5% Over 20 miles
- T3-2B: Phase Break Option for T3-2, 2.5% Average Grade, 3.5% Sustained Grade over 3.4 miles

Antelope Valley Subsection

- AV3B: Between UPRR and Sierra Highway (Partially Elevated)
- AV4 Option: Within or Adjacent to Sierra Highway – Completely avoids UPRR Right-of-way (Primarily Elevated)

The recommended alternatives through the Edison Subsection parallel either Edison Highway or SR-58, and are fully or elevated or partially elevated.

The recommended alternatives in the Tehachapi Subsection include a combination of elevated, tunnel, and at-grade sections that, in general, parallel SR-58, but travel in a more direct path to maintain design standards and optimum slopes. Two alternatives allow for a traction power phase break facility in a relatively flat area west of the community of Keene.

The recommended alternatives in the Antelope Valley Subsection are primarily elevated through Rosamond and Lancaster but travel at grade in the less developed areas adjacent to the west side of the UPRR and Sierra Highway.

Table ES-1 summarizes the findings and recommendations of this Alternatives Analysis for all alignment alternatives. Alignments recommended to be carried forward into the EIR/EIS are shown in Figure ES-6. Those alternatives recommended not to be carried forward into the EIR/EIS are shown in Figures ES-4 and ES-5.

ES.2 Alternative Analysis Evaluation Measures

The alignment alternatives and design options carried forward into the detailed alternatives analysis were assessed for each of the project objectives and evaluation measures. This information was then used to determine which alternatives are feasible and practicable and should be carried forward into preliminary engineering design and environmental review as part of the EIR/EIS. The primary evaluation measures are listed below.

- Design objectives (including measures such as travel time and cost)
- Land use (including measures such as consistency with land use and general plans)
- Constructability (including measures such as type of construction, cost, and access to the corridor)
- Community impacts (including measures such as amount of land acquisition)
- Natural resources (including measures such as impacts to wetlands, potential threatened and endangered species habitat, and important farmlands)
- Environmental quality (including measures such as number of sensitive noise receptors)
- Additional considerations (including measures such as ability to meet project purpose and support by public and agencies)

ES.3 Bakersfield to Palmdale High Speed Train Project Background

Six general alignment corridors were considered for the Bakersfield to Sylmar section in the Statewide Program EIR/EIS (2005). Only three of those six corridors connected Bakersfield with Palmdale, and generally followed the, (1) SR-58/Soledad Canyon, (2) SR-138, and (3) the California Aqueduct corridors. Subsequently, both the SR-138 and Aqueducts alignments were eliminated due to constructability and seismic constraints. Both alignments would require long tunnels and sustained grades much greater than current HST rolling stock could achieve, and would also cross multiple faults below grade, which is

prohibited by design standards. In contrast, the SR-58/Soledad Canyon alignment offers acceptable grades and minimizes tunnel length and also allows crossing faults at grade. As a result, the SR-58/Soledad Canyon alignment was selected as the Program EIR/EIS Preferred Alignment for the Bakersfield-Palmdale Section in 2005. The Bakersfield to Palmdale HST Project EIR/EIS builds upon all previous work prepared for and incorporated in the Statewide Program EIR/EIS and this Preliminary Alternatives Analysis Report; and involves the development of preliminary engineering designs and the assessment of potential environmental effects associated with HST system construction, operation, and maintenance along the State Route 58/14 corridor from Bakersfield to Palmdale.

ES.4 Public and Agency Outreach Efforts

The Authority and the FRA, in addition to performing engineering and environmental analysis, have engaged local representatives and public agencies, business and agricultural interests, the general public, and the communities throughout the corridor and will continue to incorporate their input. In August 2009, the Authority and the FRA began a project-level environmental review of the Bakersfield to Palmdale HST Section per requirements of CEQA and NEPA. Scoping meetings were held in September 2009 to receive input on the scope of issues that should be analyzed in the EIR/EIS. The final scoping report for the Bakersfield to Palmdale Section was issued in December 2009.

Agency, general public, and small group meetings have been held throughout the Alternatives Analysis process. The purpose of these meetings has been to explain the Alternatives Analysis process, share the results of the preliminary studies with the public and agencies, and receive feedback on the alternatives considered. Input and comments were considered for the initial alignment alternatives and design options presented in this AA Report. Feedback from the public and agencies included issues such as noise, visual impacts, vibration, community cohesion, biological impacts, project cost and funding, right-of-way, and more.

ES.5 Next Steps

This Preliminary Alternatives Analysis Report for the Bakersfield to Palmdale Section informs the Project Description for the EIR/EIS. It also sets parameters for the next level of design and environmental analysis. Specific activities will include:

- Board Action to Accept Staff Recommendations on Alternatives to be Carried Forward
- Continue to meet with Stakeholders and the Public
- Prepare Supplemental AA Reports As Required
- Begin Environmental Studies and 15% Design
- Complete Draft EIR/EIS by July 2012
- Complete Final EIR/EIS by March 2013

As the engineering and environmental work continues, the Authority will continue to meet and engage communities along the Bakersfield to Palmdale Section in a discussion about the different alternatives. This ongoing work will provide the Authority, FRA and the communities in Bakersfield to Palmdale Section with more details and a fuller picture of both the design options in each subsection and a comprehensive vision of the entire corridor.

A Supplemental Alternative Analysis report will be prepared and will consider feedback received on this Preliminary Alternative Analysis report and discuss how the alternatives analysis will be incorporated into the detailed engineering design and environmental review as part of the EIR/EIS for the Bakersfield to Palmdale Section.

Table ES-1. Alignment Alternatives Considered

ALIGNMENT ALTERNATIVE/STATION LOCATION AND DESIGN OPTIONS	AA DECISION		REASONS FOR ELIMINATION (P–Primary S–Secondary)							ENVIRONMENTAL/OTHER CONCERNS
	Carried Forward	Withdrawn	Construction	Incompatibility	Right-of-Way	Connectivity/ Accessibility	Revenue/ Ridership	Community Impact	Environment	
Edison Subsection										
E2A: SR-58 Adjacent North Side (Partially At-Grade)	**X**									Requires reconstruction of five interchanges along SR 58; Lower construction costs resulting from at-grade construction would be increased by reconstruction of multiple SR-58 interchanges; 157 acres of agricultural land would be permanently displaced,
E2B: SR-58 Adjacent North Side (All Elevated)	**X**									Displaces slightly less acreage of farmland than E2A, but allows possibility of replanting crops underneath elevated structures along the north side of SR 58; Requires some reconstruction of SR-58 ramps
E3: In SR-58 Median (All Elevated)		**X**	**P**		**S**			**S**		Would require a 2-mile realignment of SR-58 and reconstruction of multiple overpasses to conform with HST geometry or use of massive straddle bents spanning the freeway; Lengthy approval process from Caltrans required; Realignment and reconstruction of SR-58 would displace 81 acres of farmland; Highest capital cost and greatest length of elevated alignment; Construction and maintenance of HST structures within the SR-58 right of way would require temporary closure of freeway lanes with coordination and approval from Caltrans.
E4: Along Edison Highway (All Elevated)	**X**									Least amount of agricultural land affected; Requires less roadway reconstruction than E2 and E3 Alternatives; Would affect the most residential parcels; Offers opportunity to place HST piers in county right-of-way or undeveloped strip of land adjacent to Edison Highway; HST alignment passes near but does not displace school facilities or residences in town of Edison; May impede access to packing and shipping plants along Edison Highway; Requires minor realignment of Edison Highway and redesign to improve vehicle circulation through the town of Edison
Tehachapi Subsection										
T3-1: Quantm-Generated Alignment, 2.65% Average Grade, 2.75% Sustained Grade over 12 miles	**X**									T3-1 offers an overall reduction in length and height of viaducts as compared to T3-2, and has the lowest capital cost;; Does not allow "phase break for" traction power facilities; Crosses least amount of endangered species habitat..
T3-2: Modified Quantm-Generated Alignment, 2.5% Average Grade, 2.5% Sustained Grade over 20 miles	**X**									Most amount of agricultural parcels affected; Most amount of elevated structure, least of tunneling; Higher capital cost than T3-2; Greatest maintenance cost because of the height and amount of elevated structures; Like T3-2B, crosses most acres of endangered species habitat.
T3-B: Phase Break Alignment, 2.65% Average Grade, 3.5% Sustained Grade over 3.4 miles	**X**									Contains large cuttings and fillings of earth; 15% of the alignment is on viaduct and consists of several very tall structures (i.e. 150+ feet), increasing capital costs relative to T3-1 and T3-2; Least amount of agricultural parcels affected and less endangered species habitat than T3-2.
T3-2B: Revised Phase Break Alignment, 2.5% Average Grade, 3.5% Sustained Grade over 3.4 miles	**X**									Least amount of elevated structure, most tunneling, so highest capital cost; Lowest maintenance cost because least amount of elevated structure; Least amount of residential parcels affected; Similar to T3-2, crosses most acres of endangered species habitat; Reduces area of wetland impact in Proctor Lake

Table ES-1. Alignment Alternatives Considered

ALIGNMENT ALTERNATIVE/STATION LOCATION AND DESIGN OPTIONS	AA DECISION		REASONS FOR ELIMINATION (P–Primary S–Secondary)							ENVIRONMENTAL/OTHER CONCERNS
	Carried Forward	Withdrawn	Construction	Incompatibility	Right-of-Way	Connectivity/ Accessibility	Revenue/ Ridership	Community Impact	Environment	
Antelope Valley Subsection										
AV2: East Side of UPRR (Mixed At-Grade and Elevated)		X	P		P			S		Affects access to the most parcels; Highest capital cost of all alternatives; Encroaches on multiple UPRR parcels; Requires two long skewed crossings of UPRR, requiring pier placement for the elevated structure to be within the railroad right-of-way
AV3A: Between UPRR and Sierra Highway (All At-Grade)		X	P	P	P			S		Lowest capital cost of all alternatives; Lowest operating costs because less energy requirements due to the at-grade configuration; Requires closing or grade separating major east-west arterials; Conflicts with City redesign of Lancaster Boulevard and severs Lancaster Boulevard at Sierra Highway; Displaces the Lancaster Metrolink Station and some parking; May require realignment of a portion of Sierra Highway; Displaces multiple commercial properties south of the Metrolink Station; Displaces existing bike path; Encroaches on UPRR property outside the nominal 100-foot wide railroad right-of-way.
AV3B: Between UPRR and Sierra Highway (Partially Elevated)	X									Displaces the Lancaster Metrolink Station and some parking; May require realignment of a portion of Sierra Highway; Displaces existing bike path; Encroaches on UPRR property outside the nominal 100-foot wide railroad right-of-way; Displaces multiple commercial properties south of the Metrolink Station
AV4: Within or Adjacent to Sierra Highway (Primarily Elevated)		X			P			P		Will require realignment of a portion of Sierra Highway; Along with AV4 Option, affects the most residential parcels for noise and vibration; May impede access to local businesses and Whit Carter Park; Displaces some Lancaster Metrolink Station parking; Encroaches on UPRR property outside the nominal 100-foot wide railroad right-of-way; Displaces multiple commercial properties south of the Metrolink Station
AV4 Option: Within or Adjacent to Sierra Highway – UPRR Avoidance Option (Primarily Elevated)	X									Completely avoids UPRR property; May affect access to commercial properties south of Avenue J; Along with AV4, affects the most residential parcels for noise and vibration; May require redesign of Sierra Highway north of Avenue I

Figure ES- 1. Edison Subsection — Alignment Alternatives Considered

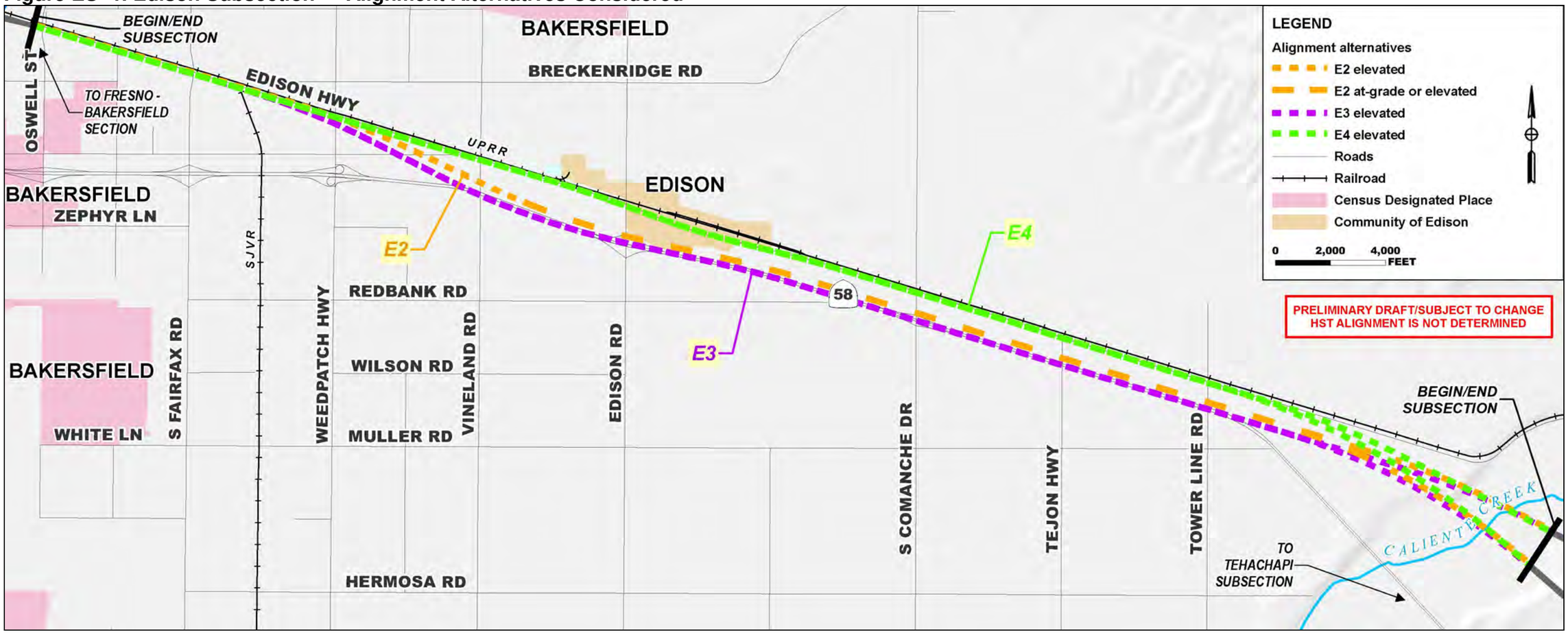

Figure ES- 2. Tehachapi Subsection — Alignment Alternatives Considered

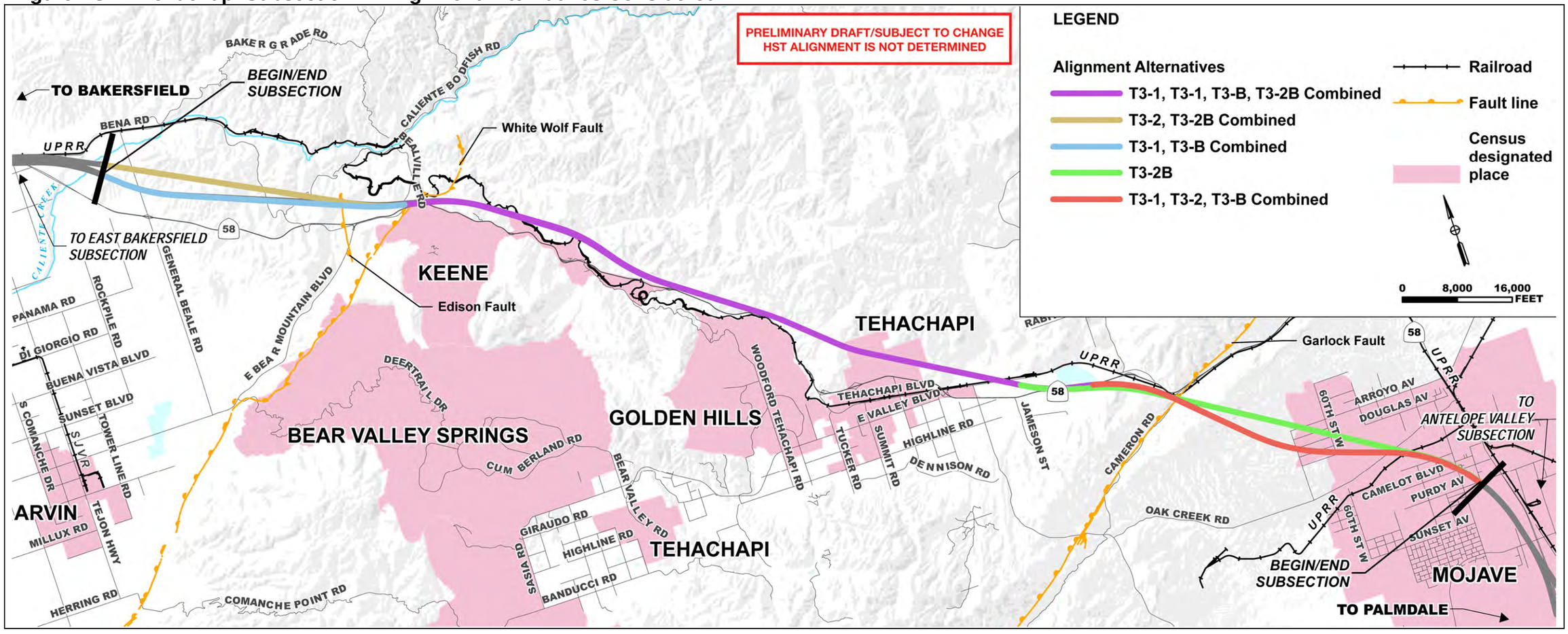

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Figure ES- 3. Antelope Valley Subsection — Alignment Alternatives Considered

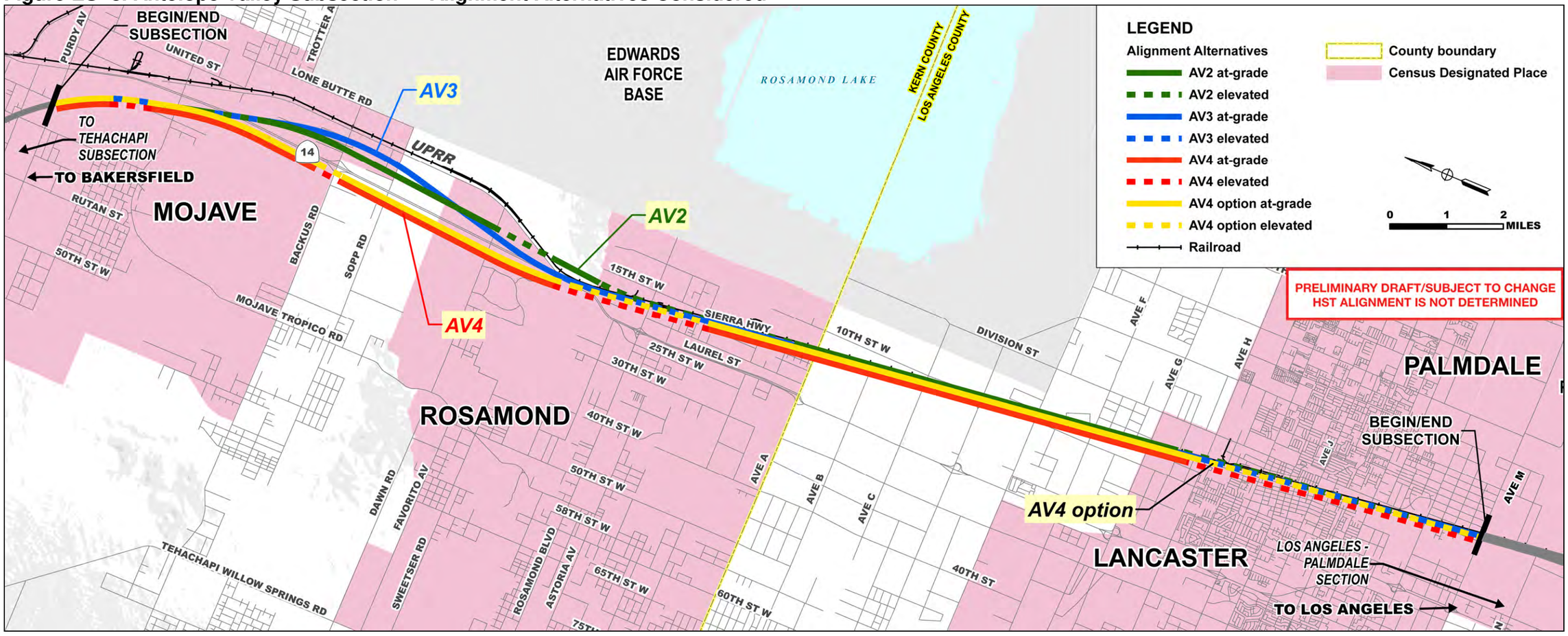

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Figure ES- 4. Edison Subsection — Alignment Alternatives Withdrawn

Figure ES- 5. Antelope Valley Subsection — Alignment Alternatives Withdrawn

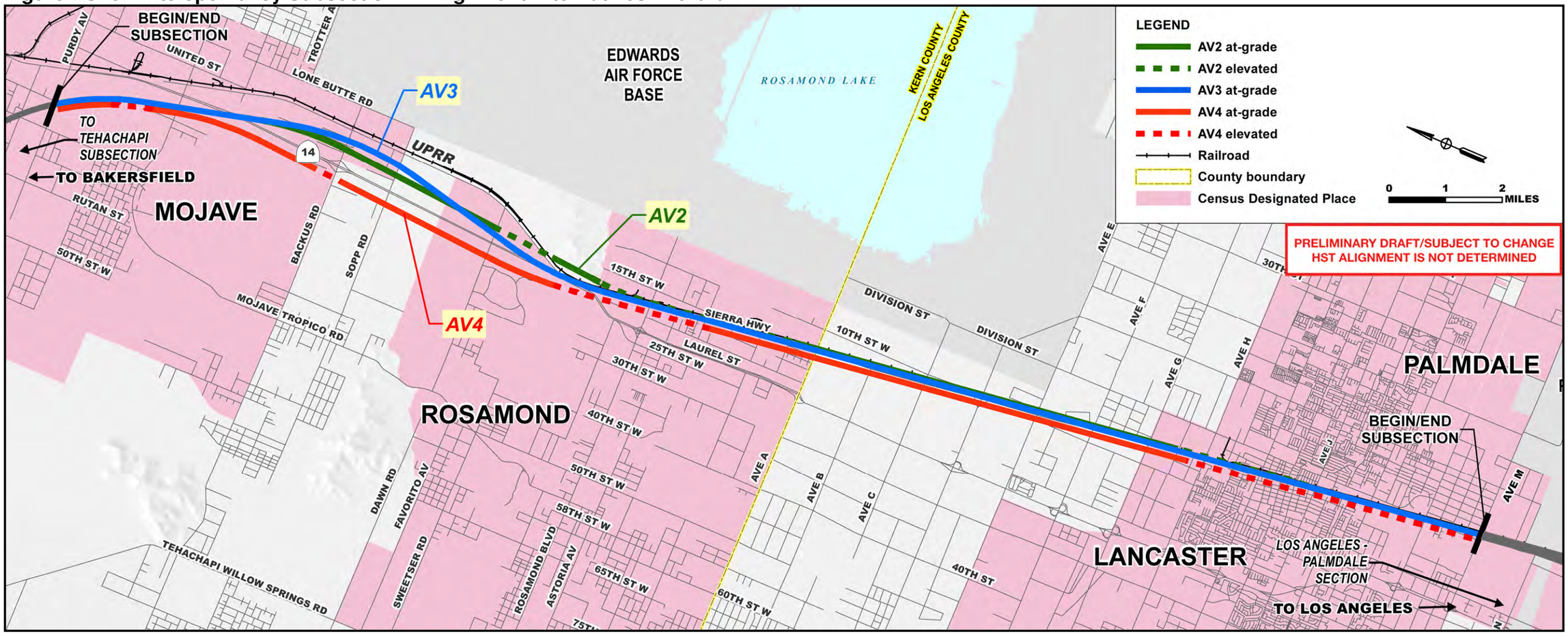

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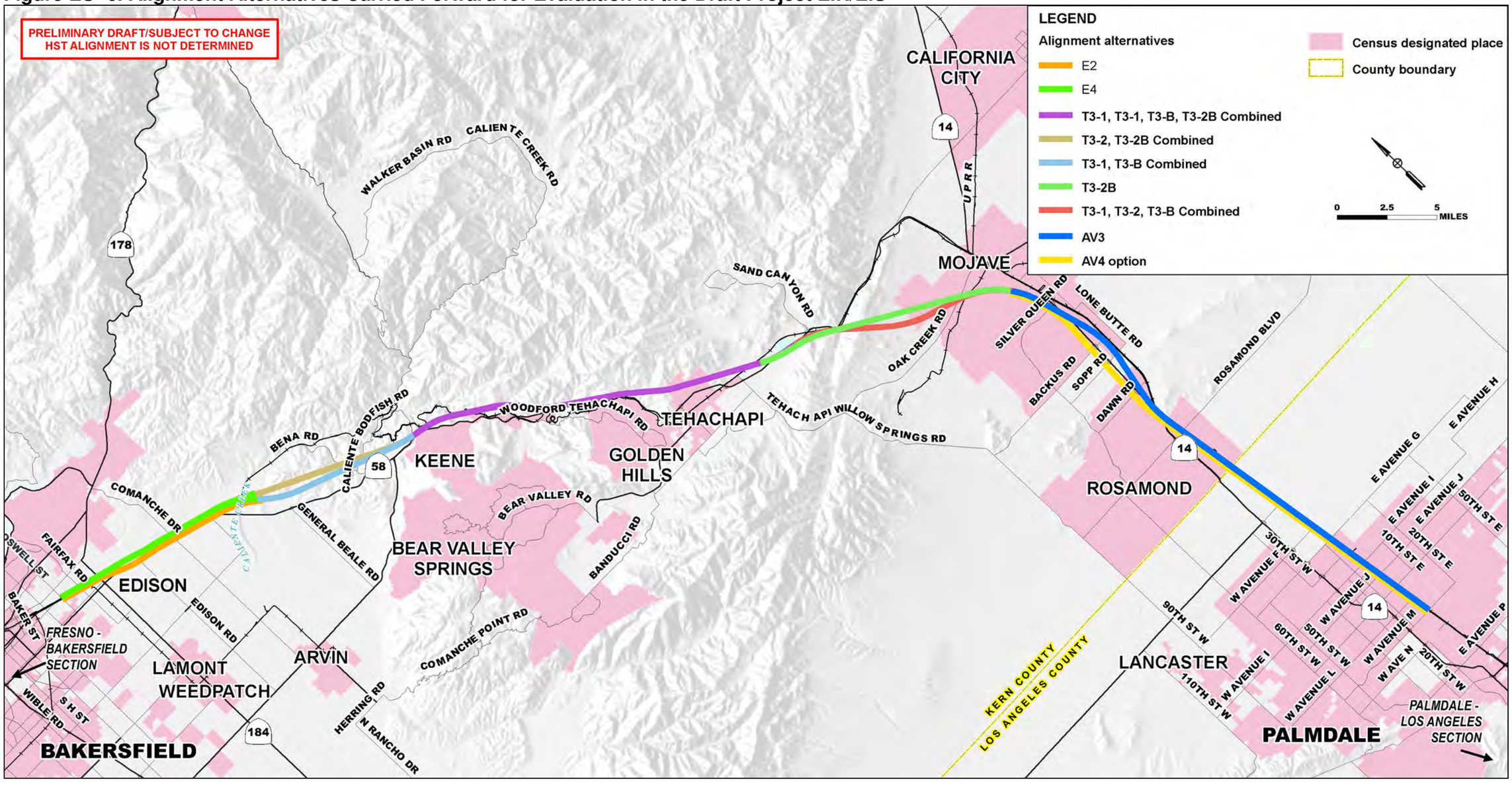
Figure ES- 6. Alignment Alternatives Carried Forward for Evaluation in the Draft Project EIR/EIS



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